

How to Write Good Test Questions



PREPARED AND PRESENTED
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Abstract

- This presentation outlines the procedures and processes for developing effective test questions. It emphasizes the importance of starting the authoring process with meaningful question ideas and explains how to identify them. We show how to develop effective test questions from the ideas. Examples from a wide variety of item types are provided and discussed.



Alpine Media Corporation

- Established 1992
- Certification Exams
- Practice Exams
- Language Training
- Psychometric Consulting
- Partner of Questionmark since 2000

Leaders in Psychometrics



Dr. James B. Olsen

- Leading expert in item and test development, validation, & evaluation
- Educational and corporate consultant
- ATP board member
- Expert in computer-adaptive testing

Item Writing is a Creative Art

- “Item writing is an art. It requires an uncommon combination of special abilities. It is mastered only through extensive and critically supervised practice. It demands and tends to develop high standards of quality and a sense of pride in craftsmanship.”
- “Item writing is essentially creative. Each item as it is being written presents new problems and new opportunities. Just as there can be no set formulas for producing a good story and a good painting, so there can be no set of rules that will guarantee the production of good test items.” Robert L. Ebel 1951

Requirements for Writing Good Items

1. The item writer must have thorough mastery of the subject matter being tested.
2. The writer must possess a rational and well developed set of thinking processes to determine what is most important to test.
3. The writer must understand the individuals for whom the test or items are intended,
4. The item writer must be a master of verbal communication.
5. The item writer must be skilled in handling the special technology used for item writing.
6. The process of constructing good test items is not simple.

Ideas for Test Items

- **Every test item begins with an idea in the mind of the item writer. The production and selection of ideas upon which test items may be based is one of the most difficult problems facing the item writer. The item writer is given the responsibility of producing ideas and developing them as items that will satisfy the specification of the test plan. The quality of the test produced depends to a considerable extent upon the item writer's success in dealing with this problem.**

The Nature of Item Ideas

- In actual practice item ideas are seldom formally stated. Usually they exist only temporarily and with no verbal explicitness in the mind of the item writer. An idea occurs to the writer, the writer judges the probable contribution of the item to the test, and if this is satisfactory, the writer proceeds immediately to write it in approximately its final form.

Item Ideas

- **There is no automatic process for the production of item ideas. They must be invented or discovered and in the process chance ideas and inspirations are very important. It is possible, however, to stimulate these processes by appropriate material.**

Item Ideas

- **Item ideas should also be selected on the basis of importance. While the test plan usually indicates the general aspects of achievement that are regarded as important, it is the responsibility of the item writer to select the important specific aspects of achievement as item topics.**
- **Finally, in the selection of item ideas it is necessary to consider their probable ability to discriminate between those that possess and those who lack a given understanding or ability.**

Selecting Item Ideas

- “The process of selecting item ideas goes on simultaneously with the process of inventing them. Skill in item writing depends not only upon prolific inventiveness but also upon discriminating judgment in the selection. In selecting item ideas, the writer must consider their appropriateness, importance, and probable discriminating ability.” Robert Ebel

“The Art of Item Development”

The Art of Item Development

**Creating Valid, High Quality
Test and Assessment Items**



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- Training workbook provided to Alpine Media Clients
- Provides excellent guidelines for item writers
- Used to train hundreds of item writers

Your Role & What to Expect



Effective Test Items

- **Valid and high quality items**
 - **Match the objective**
 - **Test at the appropriate cognitive level**
 - **Are clear and correct**

Rule #1



Only ask people
questions they can
answer.

(Van Mondfrans, 1985)

Cognitive Levels

- Cognitive levels refer to types of thinking required.
 - What type of hammer is this?
 - How do you use this type of hammer?
 - Which type of hammer should you use in this situation?
- What? (Knowledge and Concepts)
- How? (Procedures and Performances)
- Why? (Problem Solving and Reasoning)
- Objectives should contain action verbs.
- Test items will use action verbs.

Three Main Types of Questions

- Knowledge, Skill, Performance
- Mastery, Power and Speed
- Selected Response and Constructed Response

Knowledge, Skill, Performance

- Knowledge items require the candidate to demonstrate their knowledge of a fact, principle or procedure
- Skill items require the candidate to apply or use knowledge in novel ways You may also use skill items to evaluate combinations of physical and cognitive abilities.
- Performance items require the candidate to use skills in a process or sequence to accomplish a task

Mastery, Power, and Speed

- Mastery test items contain critical information that every competent candidate must know to exam is often set at 90% or higher.
- Power test items contain information that is important for competence but that not every candidate will know.
- Items for speeded tests are not necessarily different from power items. Speeded tests involve severe time constraints on the candidate, such that an average candidate will not be able to complete all the items.

Selected & Constructed Response

- Selected response items require the candidate to select an answer from a set of options (e.g., multiple choice or true/false).
- Constructed response items require the candidate to write something (i.e., short answer, fill in the blank, essay, or performance tasks).

Variety of Item Types

- Multiple Choice
- Multiple-selection (Multiple Response)
- Point-and-Click (Hotspot)
- Matching
- Drag-and drop
- Order and Rank Objects
- Short Answer

Item Type: Multiple Choice

- Presents a problem in the form of a question stem.
- Requires the candidate to select one absolutely correct answer from among several (four or five) incorrect but plausible options.
- Can measure content at all cognitive levels.
- Can be used with stems that are incomplete sentences (though we recommend stems that use complete sentences).

Sample Item: Multiple Choice

What hormone 1) increases the rate and strength of the heartbeat, 2) increases blood pressure, and 3) increases the metabolic rate? (Select one.)

- a. Adrenaline * (*In this and following examples, the asterisk * indicates the correct answer.*)
- b. Glucagon
- c. Leptin
- d. Oxytocin

Sample Item: Multiple Choice

Given: An employee of a U. S. company creates a document that can be copyrighted.

What doctrine of the U.S. Copyright Act allows the employee's company to claim ownership of the document's copyright? (Select one.)

- a. Copyright-fair-practices doctrine**
- b. Employee-copyright-assignment doctrine**
- c. Research-and-development-protection doctrine**
- d. Work-made-for-hire doctrine ***

Item Type: Multiple Selection

- Stem and options structured similar to multiple-choice item.
- Offers more options (between five and eight) and more than one correct answer.
- Most useful when examinee must know more than one correct answer to a question.

Sample Item: Multiple Selection

Which three actions listed below must an Internet service provider take to qualify for “safe harbor” protection under the Digital Millennium Copyright Act (Public Law 105-304)? (Select three.)

1. Accommodate standard copyright protection measures. *
2. Act against clients who post illegal copyrighted material.
3. Approve client content before permitting content to be posted.
4. Monitor the content of client materials posted through its service.
5. Post compliance representative contact information on its website. *
6. Register an infringement notification agent with the U.S. Copyright Office. *

Item Type: Point-and-Click

- Graphic variant of a multiple-choice item.
- The stem presents the problem.
- Keyed response is the target region of the graphic.
- Distractors are every other point or region on the graphic.

Sample Item: Point and Click

Click on the gerund in the following sentence.

The new manager had always found the prospect of running a hotel appealing.

Key:

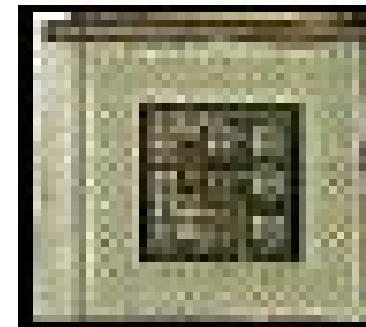
The new manager had always found the prospect of running a hotel appealing.

Sample Item: Point-and-Click

Click on the zero insertion force (ZIF) socket on this illustration of a computer motherboard.



Key:



Item Type: Matching

- Item presents a numbered list of stems and a lettered set of options.
- Item tests knowledge of facts, definitions, and classifications.
- Examinee matches stems with appropriate options.

Sample Item: Matching

Match each plant characteristic on the left with its correct definition in the list on the right. (Write the letter of the definition in the space provided.)

- _____ 1. deliquescent
- _____ 2. excurrent
- _____ 3. fugacious
- _____ 4. stoloniferous

- a. Covered with coarse or stiff, long hairs
- b. Falling or withering away very early (3)
- c. Having a trunk dividing into several large branches (1)
- d. Having lower branches or runners which tend to root (4)
- e. Not capable of doing well under dense forest cover
- f. Having the axis prolonged to form an undivided main trunk (2)
- g. Terminating in a rigid, sharp point

Item Type: Drag-and-Drop

- A graphic variant of the matching item type.
- Requires candidate to select a “source” object with the mouse pointer, drag it to a desired “destination” location on the screen and then “drop” it on the chosen spot.

Sample Item: Drag-and-Drop

Given: Each sentence on the right is an example of a logical fallacy. On the left are the names of several logical fallacies.

Match each example sentence on the right with the appropriate type of logical fallacy on the left. (Click on an example sentence on the right; drag and drop the example sentence on top of the name of the logical fallacy.)

- A. Ad hominem
- B. False analogy
- C. False dilemma
- D. Hasty generalization
- E. Stereotyping

- 1. I have to balance my checkbook; why doesn't the government have to?
- 2. You got sick at that place? I'll never eat there again!
- 3. You think deficits don't matter? You, sir, are brain-dead!
- 4. My country: Love it or leave it!
- 5. We need to close the border; our welfare rolls are full already!

* Key: A = 3, B = 1, C = 4, D = 2, E =

Item Type: Order and Rank Objects

- Variant of matching and drag-and-drop item types.
- Candidate drags source objects to destination locations in a specific order (chronological, ranking, sequence of steps, etc.).

Sample Item: Order Objects

Given: A technical support representative receives a call from a customer unable to install the company's "Learning English" software package. The customer's CD-ROM drive is M:, but the installation utility only provides for drive letters D through J.

Place the following steps in the correct order, i.e., the order the technical support representative will direct the customer to follow. (Drag and drop each lettered action into the appropriate numbered box below.)

- A. Enter a user name
- B. Launch the program
- C. Create and save an *m.pth* file
- D. Check the sound function
- E. Edit and save the *drive.var* file

- 1. (E)
- 2. (C)
- 3. (B)
- 4. (A)

Item Type: Short Answer

- Rarely used due to computerized-scoring difficulties.
- Stem presents a complete, direct question that a knowledgeable candidate can answer without actually reading options.
- Stems should call for responses limited to three words or less.
- Item type works for factual recall of exact words or numbers such as computer syntax, dates, etc.

Item Writing Guidelines

- Item Composition
 - Alignment & focus, cognitive level
- Item Structure
 - Layout, question stems & answer options
- Item Mechanics
 - Syntax & usage
- Bias
- Item-type Specific

Item Writing Guidelines

- Content Alignment and Focus
 - Focus the item on aspects of the content area consistent with the test's purpose.
 - Align the item content to the specified content area.
 - Write relevant items.
 - Do not write trick questions.
 - Write independent items.

Item Writing Guidelines (example)

- ***Content Alignment and Focus***

Test objective: Understand the physical and chemical properties of gold. (Source: Goldsmith competency exam)

Gold occurs naturally in the form of flakes or dust. (T/F)

† The reason a goldsmith needs to understand gold's properties is to be able to manipulate those properties in the creation of gold artifacts. The form in which the gold appears in nature is of no consequence for that purpose.

Item Writing Guidelines (example)

More appropriate

What alloy mixture do you use to obtain “rose gold”?

- a. 50% gold, 25% silver, 25% copper
- b. 50% gold, 45% copper, 5% silver *
- c. 50% gold, 35% silver, 15% zinc
- d. 50% gold, 25% copper, 25% zinc

‡ This aspect of understanding the properties of gold is pertinent to the exam’s objective; a competent goldsmith should know this.

Item Writing Guidelines (example)

■ ***Content Alignment and Focus***

Test objective: Identify the content of the Declaration of Independence and the factors that led to its creation. (Source: Ninth Grade Civics course)

The quartering of large numbers of British soldiers in the American colonies mentioned in the Declaration of Independence means that the colonists had to pay their wages. (T/F)

† While this item is related to the stated objective, it focuses on what quartering is rather than on its role as a factor leading to the Declaration of Independence.

Item Writing Guidelines (example)

Improved

The Declaration of Independence contains a complaint against the king about the quartering of large numbers of British soldiers in private homes in the American colonies. (T/F)

Item Writing Guidelines (example)

■ ***Content Alignment and Focus***

Test Objective: Correctly identify the function of federal government agencies.

What does OSHA stand for?

- a. Organization for Security of Homeland affairs
- b. Occupational Safety and Health Administration *
- c. Office for the Study of Horticultural Activities
- d. Overseas Service for Human Advancement

Item Writing Guidelines (example)

More relevant

What federal agency conducts workplace safety inspections?

- a. FEMA
- b. USGS
- c. DEA
- d. OSHA *

Item Writing Guidelines (example)

■ ***Content Alignment and Focus***

Beethoven's Symphony No. 3 in E-Flat minor was also known as the Eroica Symphony.

TRUE *FALSE

Item Writing Guidelines (example)

■ ***Content Alignment and Focus***

Beethoven's Symphony No. 3 in E-Flat Major was also known as the Eroica Symphony.

*TRUE FALSE

Item Writing Guidelines (example)

■ ***Content Alignment and Focus***

Given: The table below shows the revenues for public education of three states for a given year. [see table]

What is the average revenue?

Follow-up question:

Given: Each state had an average enrollment of 1.7 million students.

What is the average per capita revenue?

Item Writing Guidelines (example)

Independent Follow-up Item

Given: Four states had an average enrollment of 980,000 students and average revenue of \$8 billion.

What is the average per capita revenue?

Item Writing Guidelines

- **Cognitive Level**

- Match the item's cognitive level to the level expected of qualified examinees.
- Write the items at the correct level of difficulty.

Item Writing Guidelines

- **Item Structure guidelines**
 - Item layout
 - Use a consistent item structure and layout that incorporates all the necessary elements.
 - Provide all information necessary to answer the question.

Item Writing Guidelines

■ **Item Structure Guidelines**

- Question Stems
- Do not provide clues in the stem that point to or disqualify specific answer options.
 - ◆ Ask a complete question.
 - ◆ Avoid negatively worded stems.
 - ◆ Place repeated words in the stem.

Item Writing Guidelines

■ **Item Structure Guidelines**

■ Answer Options

- ◆ Randomize options unless logical order is required.
- ◆ Create plausible distractors.
- ◆ Ensure all answer options are mutually exclusive.
- ◆ Ensure that answer options are homogeneous.

Item Writing Guidelines

■ **Item Mechanics Guidelines**

- Clarity and Conciseness of Language
 - ◆ Is the item language clear, concise, internally consistent, and free of distracting or irrelevant material?
 - ◆ Is the item free of unnecessary slang, technical jargon?
 - ◆ Is the usage of terms, punctuation, and other conventions consistent?

Item Writing Guidelines

- **Bias Guidelines**
 - Avoid gender-specific references
 - Avoid personal or place names
 - Avoid regionalisms

Item Writing Guidelines

- **Item-type Specific Guidelines**
 - Do not use complex multiple-choice items that test multiple ideas in the same question
 - Provide an unequal number of stimuli & responses

Effective Test Items

- **Valid and high quality items**
 - Matches the objective
 - Appropriate cognitive level
 - Clear and correct

Examples of Original and Revised Test Items

This section shows several examples of original or first edition test items and how these items were improved with revision.

Example 1 (Multiple Selection) - Original Item

Given: [none]

Stem: Identify expenses that can be used as deductions on your federal taxes. Check all that apply.

Options:

- state and local income taxes*
- gifts to charity*
- gifts to family
- home mortgage interest*
- home mortgage payments
- real estate taxes*

Reference:

Title: U.S. Income Tax Forms, Year: 2001, Page #: Schedule A & B.

Example 1 (Multiple Selection) - Revised Item

Given: A single homeowner whose sole source of income is a salary of \$55,000 per year files using Form 1040 and itemizes deductions.

Stem: Which of the following expenses may this taxpayer claim as deductions? (Select all that apply.)

Options:

- state income taxes*
- local income taxes*
- gifts to charity*
- gifts to family
- home mortgage interest*
- home mortgage payments
- real estate taxes*

Reference:

U.S. Internal Revenue Service, Instructions for Schedules to Form 1040: 2001 Instructions for Schedule A, Itemized Deductions, pp. 1-8.

Example 1 (Matching) - Original Item

Given: [None.]

Question Stem: Each of the items below may be washed in an automatic front-load washing machine. For each item, select the best temperature setting for the wash cycle. (Type the number of the correct setting in the space provided.)

Stimuli (premises):

1. Lightly soiled white towel
2. Silk blouse
3. Non-colorfast cotton shirt
4. Heavily soiled colorfast jeans
5. Woolen jacket

Response options:

1. Cold
2. Warm
3. Hot

Example 1 (Matching) - Revised Item

Given: [None needed.]

Question Stem: Match each clothing item on the left with the appropriate washing machine temperature setting on the right. (Place the letter for the temperature setting in the space provided. You may use a setting more than once.)

Stimuli (premises):

1. White cotton robe (B)
2. Washable silk blouse (A)
3. Non-colorfast cotton shirt (A)
4. Heavily soiled colorfast jeans (C)
5. Washable woolen jacket (B)

Response Options:

1. Cold
2. Warm
3. Hot

Practical Application Exercises

- This section presents a series of fourteen application exercises that allow us to practice and discuss what has learned so far about writing effective test items.

Applied Exercise 1

Instructional Objective: Describe the provisions of each article of the U. S. Constitution.

Unacceptable

The U.S. Constitution consists of nine articles.

Applied Exercise 1 (continued)

Instructional Objective: Describe the provisions of each article of the U. S. Constitution.

Unacceptable

The U.S. Constitution consists of nine articles.

Acceptable

Article I of the U.S. Constitution lays out the functions and powers of the executive branch of government.

Applied Exercise 2

Instructional Objective: Differentiate between design patents and utility patents.

Unacceptable

What is the difference between a design patent (valid for 14 years) and a utility patent (valid for 20 years) according to Title 35 of the United States Code (35 U.S.C.) as interpreted by the U.S. Patent and Trademark Office (USPTO)? (Select one.)

- a. Utility patents apply to manufacturing and fabrication processes while design patents apply to conceptualization and planning processes.
- b. Utility patents cover new and unique items while design patents cover items and processes similar to previously patented ones.
- c. Utility patents protect functional aspects of technology while design patents protect the appearance of an article of manufacture.*
- d. Utility patents safeguard the final form of an article or invention while design patents safeguard them during the design process.

Applied Exercise 2 (continued)

Unacceptable

What is the difference between a design patent (valid for 14 years) and a utility patent (valid for 20 years) according to Title 35 of the United States Code (35 U.S.C.) as interpreted by the U.S. Patent and Trademark Office (USPTO)? (Select one.)

- a. Utility patents apply to manufacturing and fabrication processes while design patents apply to conceptualization and planning processes.
- b. Utility patents cover new and unique items while design patents cover items and processes similar to previously patented ones.
- c. Utility patents protect functional aspects of technology while design patents protect the appearance of an article of manufacture.*
- d. Utility patents safeguard the final form of an article or invention while design patents safeguard them during the design process.

Acceptable

What is the difference between a design patent and a utility patent? (Select one.)

Applied Exercise 3

Unacceptable

Given: A company has identified a serious fiscal discrepancy in its books due to an auditor's OVERSIGHT.

Which of the following will the Vice President for Finance recommend to the President?

Applied Exercise 3 (continued)

Unacceptable

Given: A company has identified a serious fiscal discrepancy in its books due to an auditor's OVERSIGHT. [There follows a full description of the specifics.]

Which of the following will the Vice President for Finance recommend to the President?

Acceptable

Given: A company has identified a serious fiscal discrepancy in its books due to an auditor's ERROR.

Applied Exercise 4

Unacceptable

Which of the following statements about mixing bricklaying mortar is correct?
(Select one.)

- a. Use two parts sand, one part cement, and one part lime.
- b. Mix to a soft, pliable consistency about like toothpaste.*
- c. ALWAYS add a plasticiser to the mix.
- d. Mix cement and water before adding sand.

Applied Exercise 4 (continued)

Acceptable

Which of the following statements about mixing bricklaying mortar is correct?
(Select one.)

- a. Use two parts sand, one part cement, and one part lime.
- b. Mix to a soft, pliable consistency about like toothpaste.*
- c. Add a plasticiser to stiffen the mix.
- d. Mix cement and water before adding sand.

Applied Exercise 5

Unacceptable

Blowing pure oxygen at supersonic velocity into the basic oxygen furnace charge creates endothermic reactions sufficient to shorten the refining time to about 20 minutes, depending on the size of the heat.

Applied Exercise 5 (continued)

Unacceptable

Blowing pure oxygen at supersonic velocity into the basic oxygen furnace charge creates endothermic reactions sufficient to shorten the refining time to about 20 minutes, depending on the size of the heat.

Acceptable

Blowing pure oxygen at high speed into a mixture of liquid iron and scrap metal greatly reduces the processing time for a batch of steel.

Applied Exercise 6

Unacceptable

Given: A technician is troubleshooting a computer. The hard disk fails to boot during start up. The machine has power, but the drive lights for the hard disk never come on.

What is the first thing he or she should check?

Applied Exercise 6 (continued)

Acceptable

Given: A technician is troubleshooting a computer. The hard disk fails to boot during start up. The machine has power, but the drive lights for the hard disk never come on.

What is the first thing to check?

Applied Exercise 7

Unacceptable

Which three of the following are rules for successful finish carpentry? (Select three.)

- a. Avoid exposing wood end grain.*
- b. Many folding rulers have a brass end.
- c. Fit the joint before cutting to length.*
- d. Some joints don't need to be perfect.*
- e. Wood moves, so it is hard to keep edges flush.
- f. Timber framing lends itself to open floor plans.

Applied Exercise 7 (continued)

Unacceptable

Which three of the following are rules for successful finish carpentry? (Select three.)

Acceptable

- a. Set wall studs 16 inches apart.
- b. Avoid exposing wood end grain.*
- c. Lay decking perpendicular to joists.
- d. Fit the joint before cutting to length.*
- e. Some joints don't need to be perfect.*
- f. Insure that window frames are square.

Applied Exercise 8

Unacceptable

Which of the following did NOT occur in Germany in the 12 months prior to its 1990 reunification? (Select one.)

- a. Opening of East Germany's borders with the West.
- b. Monetary unification under the West German mark.
- c. NATO agreement to include unified Germany as a member.
- d. Massive anti-reunification demonstrations in major German cities.*

Applied Exercise 8 (continued)

Acceptable

Which of the following occurred in Germany in the 12 months prior to its 1990 reunification? (Select three.)

- a. Opening of East Germany's borders with the West.*
- b. Monetary unification under the West German mark.*
- c. Withdrawal of all foreign troops from the city of Berlin.
- d. NATO agreement to include unified Germany as a member.*
- e. Withdrawal of all Russian military forces from German territory.
- f. Massive anti-reunification demonstrations in major German cities.

Applied Exercise 9

Unacceptable

Given: An aircraft begins to roll to the right.

Which control setting must the pilot use to return to straight and level flight?

- a. Right aileron up, left aileron down
- b. Left aileron up, right aileron down*
- c. Elevator up
- d. Rudder right

Applied Exercise 9 (continued)

Unacceptable

Given: An aircraft begins to roll to the right.

Which control setting must the pilot use to return to straight and level flight?

Acceptable

- a. Right aileron up, left aileron down
- b. Left aileron up, right aileron down*
- c. Rudder right
- d. Rudder left

Applied Exercise 10

Unacceptable

What differentiates porcelain from ordinary earthenware pottery? (Select one.)

- a. Made of special soft brown clay
- b. Painted with lead-based paints
- c. Petuntse (feldspar) added to the clay mixture which is then fired at a much higher temperature than other pottery*
- d. Created originally in the city of Porcel

Applied Exercise 10 (continued)

Unacceptable

What differentiates porcelain from ordinary earthenware pottery? (Select one.)

Acceptable

- a. Made of special soft brown clay
- b. Painted with lead-based paints
- c. Petuntse added to the clay mixture*
- d. Created originally in the city of Porcel

Applied Exercise 11

Unacceptable

Which of the following is true of a meter? (Select one.)

- a. A meter is equal to 1000 millimeters.*
- b. A meter is one-tenth of a hectometer.
- c. A meter is equivalent to 37.5 inches.
- d. A meter is equal to .0001 kilometers.

Applied Exercise 11 (continued)

Acceptable

Which of the following is true of a meter? (Select one.)

- a. Equal to 1000 millimeters*
- b. One-tenth of a hectometer
- c. Equivalent to 37.5 inches
- d. Equal to .0001 kilometers

Applied Exercise 12

Unacceptable

Match the terms with the definitions.

Applied Exercise 12 (continued)

Acceptable

Given: On the left is a list of aeronautical terms. On the right are brief descriptions of situations encountered while piloting a small aircraft.

Match each aeronautical term on the left with the description on the right which best exemplifies the meaning of the term. (Write the letter for the description in the space provided. Use each description only once or not at all.)

Applied Exercise 13

Unacceptable

Match each 19th century Russian painting on the left with the artist on the right who painted it. (Write the letter of the artist in the space provided. Use each artist only once.)

- | | | |
|--------|--|---------------------|
| (c)___ | 1. <i>A Warrior at the Crossroads</i> (1882) | a. Vasili Surikov |
| (b)___ | 2. <i>They Did Not Expect Him</i> (1884) | b. Ilya Repin |
| (d)___ | 3. <i>Girl with Peaches</i> (1887) | c. Victor Vasnetsov |
| (a)___ | 4. <i>The Boyarina Morozova</i> (1887) | d. V. Serov |

Applied Exercise 13 (continued)

Acceptable

Match each 19th century Russian painting on the left with the artist on the right who painted it. (Write the letter of the artist in the space provided. Use each artist only once or not at all.)

- | | |
|---|-----------------------|
| (f)___ 1. <i>A Warrior at the Crossroads</i> (1882) | a. Vasili Surikov |
| (d)___ 2. <i>They Did Not Expect Him</i> (1884) | b. Mikhail Vrubel |
| (g)___ 3. <i>Girl with Peaches</i> (1887) | c. Alexander Favorski |
| (a)___ 4. <i>The Boyarina Morozova</i> (1887) | d. Ilya Repin |
| | e. P.Malyavin |
| | f. Victor |
| | g. V. Serov |

Vasnetsov

Applied Exercise 14

Unacceptable

Given: A room has floor tiles $1\frac{1}{2}$ ft. square in size. The room is $7\frac{1}{2}$ tiles wide and $10\frac{1}{4}$ tiles long.

Estimate the floor's area.

Applied Exercise 14 (continued)

Unacceptable

Given: A room has floor tiles $1\frac{1}{2}$ ft. square in size. The room is $7\frac{1}{2}$ tiles wide and $10\frac{1}{4}$ tiles long.

Estimate the floor's area.

Acceptable

Given: A room has floor tiles $1\frac{1}{2}$ ft. square in size. The room is $7\frac{1}{2}$ tiles wide and $10\frac{1}{4}$ tiles long.

Estimate the floor's area to the nearest square foot.

Conclusions & Recommendations

1. Writing good test items begins by generating and critiquing item ideas from a variety of perspectives.
2. Well-crafted tests and test items are critical to the academic or professional reputations of those who use them and interpret them and to the long-term value and longevity of a test or exam.
 - A well-written test assures the accurate, fair, and valid measurement of each candidate's knowledge and skills.
 - Legally defend a particular test in court.
3. In other words, properly conceived, well-written tests easily provide sufficient value-added to justify the time and expense of creating them.